Association Between Adult and Childhood Socioeconomic Status and Prevalence of the Metabolic Syndrome in African Americans: The Pitt County Study

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We evaluated the association between socioeconomic status (SES) during childhood and adulthood and prevalence of the metabolic syndrome in African Americans. Higher adult educational status and adult skilled occupation were protective against the metabolic syndrome, but no associations were found between the metabolic syndrome and other SES variables. Differences by gender were observed. Improving access to education among African Americans could reduce risk for the metabolic syndrome, but more research is needed in minority populations. (*Am J Public Health.* 2007; 97:234–236. doi:10.2105/AJPH.2006.087429)

The metabolic syndrome is an accumulation of cardiovascular disease risk factors that often cluster together and are associated with being overweight.[1] It is an increasingly common condition in the United States[2] and is associated with an elevated burden of diabetes and cardiovascular disease.

Socioeconomic factors during adulthood (e.g., education and occupation) are correlated with the metabolic syndrome.[3–7] A study among British civil servants found a negative association between occupational status and prevalence of the metabolic syndrome[5]; a graded negative association, i.e., a steady, incremental decline, between

education and the metabolic syndrome was also found.[3] Research supports an association between socioeconomic status (SES) and the metabolic syndrome among children, and the potential mechanisms are low birthweight, poor nutrition, and inadequate physical activity.[6,8] Research supports a link between psychosocial stress and the metabolic syndrome.[9] However, little is known about associations between SES and the metabolic syndrome among US adults, and no research has been done in ethnic minority populations. We evaluated the association between socioeconomic factors during childhood and adulthood and prevalence of the metabolic syndrome in African Americans.

METHODS

Study Participants

We used data from the Pitt County Study, a community-based, prospective investigation of risk factors for hypertension and related disorders in African Americans aged 25 to 50 years in Pitt County, NC, that began in 1988.[10,11] A follow-up examination was conducted in 1993, during which participants provided a 12-hour overnight fasting blood sample. Only individuals who were normotensive (N=1407) in 1988 were invited to participate in 1993, and 85% (n=1195) did so. Of these individuals, 84% (n=1006) participated in the fasting blood draw. A second follow-up examination was conducted in 2001 to obtain information on life-course socioeconomic resources.

Study Measures

The outcome for this analysis was the metabolic syndrome, defined as having 3 or more metabolic syndrome components as described by the Adult Treatment Panel III report.[1] The following components were measured at the 1993 examination: fasting blood glucose, blood pressure, high-density lipoprotein, triglycerides, and waist circumference. Adult socioeconomic factors were collected by self-report in 1988 and included dichotomous measures of education, home ownership, employment status, and occupation; measures were obtained from Hollingshead scores (Hollingshead scores of 5–9 were coded as nonskilled, and Hollingshead scores of 1–4 were coded as skilled).[12] Childhood SES was determined by parental occupation (coded the same as adult occupation, according to Hollingshead scores) and was obtained retrospectively during the 2001 follow-up using an event history calendar, an interviewing methodology whereby easily remembered past events are used to enhance recall of target events.[13] Age and gender were determined in 1988.

Statistical Analysis

We calculated baseline characteristics as proportions. Occupation was protective for the metabolic syndrome among men but not among women in categorical analysis. We used Poisson regression with a robust variance estimator to model associations between socioeconomic variables and the metabolic syndrome (1 social exposure per model), first unadjusted and then adjusted for age (continuous variable) and gender. This method calculates prevalence proportion ratios and is preferred over logistic regression because the occurrence outcome, the Metabolic Syndrome, is not rare.[14] Analyses were weighted to be representative of the Pitt County, NC, population. No statistical interaction was observed when a gender interaction term was included ($P>.20$).

RESULTS

The metabolic syndrome prevalence was 25%. Higher educational status was protective against the metabolic syndrome (Table 1). After we controlled for age and gender, we found that the metabolic syndrome was about 30% less common among those with a high-school education or greater compared with those with less than a high-school education.

A protective association was observed for a skilled occupation but not for an unskilled occupation. No associations were observed for home ownership or childhood SES variables. Among women, being employed was associated with increased prevalence (prevalence proportion ratio=1.52; 95% confidence interval [CI]=1.04, 2.21), whereas the converse was found for men (prevalence proportion ratio=0.48; 95% CI=0.12, 1.87).

DISCUSSION

Our observation that advanced education, and to a lesser degree skilled occupation, was protective against the metabolic syndrome agrees with findings in European studies.[3,7] Potential mechanisms for this association include less psychosocial and material stress,[15] better health knowledge,[16] and better health behaviors.[15] These results suggest that improving access to higher education among African Americans could reduce risk for the metabolic syndrome.

The differential association between employment status and the metabolic syndrome by gender could be explained by gender differences in employment motivations, employment opportunities in this cohort, or work-related stress response.[17] Although home ownership is a reasonably good indicator of wealth for African Americans,[18] it was not associated with the metabolic syndrome in this study. Although childhood SES, measured by parental occupation, was independently predictive of 1988 obesity status among women in this cohort,[19] and moderately predictive of 1988 hypertension status among men,[20] it did not predict metabolic syndrome status for either gender in our study. These differences could be a result of the selective nature of the 1993 sample compared with the 1988 sample. Additional research is needed on life-course epidemiology of the metabolic syndrome in US racial/ethnic minorities. ■

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TABLE 1—Prevalence Proportion Ratios (PPRs; With 95% Confidence Intervals [CIs]) for Associations Between Socioeconomic Status and the Metabolic Syndrome: Pitt County Study, Pitt County, NC, 1998–2001

	No.	Weighted %	Weighted PPR (95% CI) Unadjusted	Weighted PPR (95% CI) Adjusted[a]
Total	1195	100		
Adult socioeconomic status				
Education				
< High school	346	28.70	Reference	Reference
≥ High school	849	71.30	0.63 (0.48, 0.83)	0.70 (0.51, 0.96)
Home ownership				
Not home owner	807	62.63	Reference	Reference
Home owner	380	37.37	1.22 (0.93, 1.61)	1.12 (0.85, 1.48)
Occupation[b]				
Unskilled	954	83.61	Reference	Reference
Skilled	196	16.39	0.84 (0.56, 1.27)	0.85 (0.57, 1.26)
Employment status				
Unemployed	170	13.22	Reference	Reference
Employed	886	86.78	1.17 (0.82, 1.67)	1.21 (0.85, 1.73)
Childhood socioeconomic status				
Parental occupation[b]				
Unskilled	923	83.25	Reference	Reference
Skilled	189	16.75	0.84 (0.55, 1.27)	0.89 (0.59, 1.35)

Note. Some SES variables may not equal the total sample number due to missing data. Metabolic syndrome was coded as follows: 1 = ≥3 metabolic syndrome components; 0 = <3 metabolic syndrome components. Metabolic syndrome components were defined according to Adult Treatment Panel III criteria; see the "Methods" section for additional detail. Of the participants, 235 (23%) were missing this metabolic syndrome variable because they refused the fasting blood draw or had missing values on blood pressure or waist circumference measures. No important differences were observed in waist circumference and systolic or diastolic blood pressure when we compared those who refused with those who did not refuse the blood draw.
[a]Adjusted for age (continuous variable) and gender.
[b]Occupation was coded as follows: unskilled = Hollingshead index score of 5–9; skilled = Hollingshead index score of 1–4. Parental occupation and adult occupation were defined using the same method.

Contributors

All authors conceptualized ideas, interpreted findings, and reviewed drafts of the article. J.C. Lucove performed statistical analyses and led the writing of the brief. J.S. Kaufman provided statistical consultation. S.A. James was the principal investigator for the Pitt County Study.

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Human Participant Protection

This study satisfied all criteria for the ethical treatment of human participants and was approved by the human subjects institutional review boards at the University of North Carolina, Chapel Hill; Duke University; and the University of Michigan, Ann Arbor.

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